**REGULATORY APPROACHES**
**TO REDUCE PARTICULATE MATTER EMISSIONS FROM**

# TRANSPORT REFRIGERATION UNITS

**September 4, 2002**

**California Environmental Protection Agency**
Air Resources Board

# Overview

- Action to-date
- Background
- Summary of last TRU proposal
- New Approach/Concepts
- Regulatory development schedule
- Contacts

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# Action To-Date

- 5th TRU Workgroup meeting
  - Plus 4 Special TRU Electrification Workgroup meetings
- 3 Public Workshops
- Reviewed feedback
- Established Control Technology Matrix
- Provided draft TRU regulation language

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# Action To-Date (cont'd)

- Completed surveys
  - Several with TRU manufacturers
  - Several with TRU engine manufacturers
  - Emission control system manufacturers
- Completed 18 site surveys
- Collected cost data for alternative technologies
  - (e.g. electric standby (E/S), cryogenic, CNG)
- Working on demos

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# Background

- Mass emissions
  - Number of TRUs: 45,000 to 55,000
  - Total PM emissions
    - >3 tons per day (>1100 tons per yr)
- Near source risk concerns
  - TRUs operating near residences
    - Large numbers congregate: 1 to 500
    - Hours of operation: 2 to 5000 hrs/week

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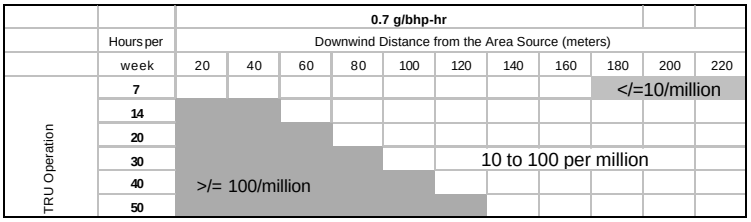
**Preliminary - Do Not Cite or Quote**

# Background (cont'd)

- Potential Near-Source Risk

Grocery Stores




Risk in potential cancers per million

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Preliminary - Do Not Cite or Quote

# Background (cont'd)

■ Potential Near-Source Risk - Distribution Center

| Hours Per Week | Hours Per Year | EF = 0.7 g/bhp-hr Downwind Distance (m) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 700 | 800 |
| 100 | 5200 | | | | | | | | | | </=10/million | | |
| 150 | 7,800 | | | | | | | | | | | | |
| 200 | 10,400 | | | | | | | | | | | | |
| 250 | 13,000 | | | | | | | | | | | | |
| 300 | 15,600 | | | | | | 10 to 100 per million | | | | | | |
| 350 | 18,200 | | | | | | | | | | | | |
| 400 | 20,800 | | | | | | | | | | | | |
| 450 | 23,400 | | | | | | | | | | | | |
| 500 | 26,000 | | | | | | | | | | | | |
| 600 | 31,200 | | | | | | | | | | | | |
| 700 | 36,400 | | | | | | | | | | | | |
| 800 | 41,600 | >/= 100 per million | | | | | | | | | | | |
| 900 | 46,800 | | | | | | | | | | | | |
| 1000 | 52,000 | | | | | | | | | | | | |
| 1100 | 57,200 | | | | | | | | | | | | |
| 1200 | 62,400 | | | | | | | | | | | | |
| 1300 | 67,600 | | | | | | | | | | | | |
| 1400 | 72,800 | | | | | | | | | | | | |
| 1500 | 78,000 | | | | | | | | | | | | |

Risk in potential cancers per million

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# Last TRU Proposal Summary

■ Key Elements

- ◆ TRU Manufacturers
  - ✦ New TRUs to be equipped with electric standby (E/S)
- ◆ Fleet Owners/Operators - Phased reqmnts
  - ✦ Replace in-use TRUs with new TRUs equipped with E/S,
  - ✦ Retrofit in-use TRUs to reduce PM emissions by 75% or to less than 0.15 g/bhp-hr, or
  - ✦ Retrofit in-use TRUs with E/S
- ◆ Facility requirements
  - ✦ Provide electric power infrastructure
  - ✦ Prohibit diesel TRU operations at facility, if E/S-equipped

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## Concerns Over Last Proposal

- Infrastructure required
- Availability of retrofit technology
- Cost
- Long term investment decisions
- Multiple, successive regulatory impacts
  - On-road & offroad standards
  - HACCP regulations

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## New Approach

- Focus on both near-source and mass reductions
- Performance-based approach to provide flexibility
- Make the long-term regulatory goal clear

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# Key Concepts

- Engine Manufacturers
  - Progressively more stringent TRU engine standards
  - Examples
    - 0.30 g/bhp-hr by 2005 or earlier
    - 0.10 g/bhp-hr by 2010 or earlier
    - 0.01 g/bhp-hr by 2015 or earlier

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# Key Concepts (cont'd)

- TRU Owner/Operators
  - Progressively more stringent in-use requirements
  - Examples: Lower in-use emissions every 10 years by
    - Retrofit
    - Repower
    - Replace

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# Key Concepts (cont'd)

- TRU Manufacturers
  - Provide options to customers
  - Examples
    - Cleaner engines
    - Verified retrofit options
    - E/S with more capacity
    - Cryogenic systems
    - Alternative fueled TRU engines
    - Non-diesel-fueled TRU engines
    - Advanced technology

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# Key Concepts (cont'd)

- Facilities
  - Provide needed infrastructure in stepwise fashion
    - Electric drive
    - Cryogenic temperature control
    - Alternative fuels
    - Advanced technologies

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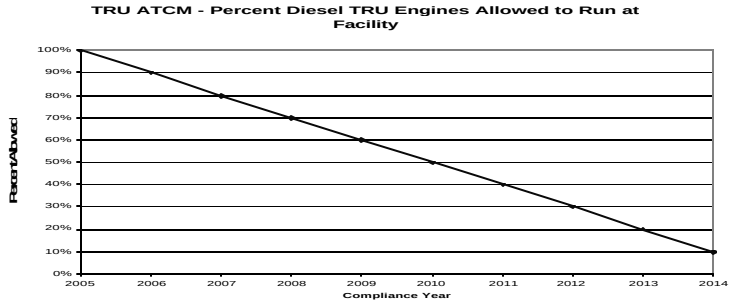
# Key Concepts (cont'd)

- Example
  - Allow decreasing numbers of diesel TRUs to operate while at facility

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# Schedule

- Next Public Workshop:  Mid-November
- Board Hearing:  Mid-2003
- Comments via email by October 1, 2002

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# Contacts

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